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Oral health in frail elderly

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Chapter 1

General introduction

General introduction

The increasing life expectancy and decreasing birth rate, particularly in industrialized countries, have resulted in a progressive demographic transformation of the society into a society characterized by an increased proportion of elderly.¹ In 2020, about 40% of the population in the Northern provinces of the Netherlands will be over 65 years of age.² Therefore, the Northern part of the Netherlands was identified as an area with optimal circumstances for research into healthy aging.³ The number of people over 80 years in this area will increase to approximately 10% of the population during the next 3 decades. Moreover, the composition of the population in this area, due to low migrations factors, is excellent for (oral) health research in elderly. It is presumed that data collected in this region are representative for the Northern Europe.³

When elderly become care dependent, their oral health often deteriorates due to neglect of oral (self)care.⁴ This neglect can be the result of the usually high need for care on many levels in these frail elderly or elderly with complex care needs. This high need for care interferes with their activities for daily living such as food intake, drug intake, getting dressed, bathing, general health care and physiotherapy. As a result, less time is reserved for activities that are commonly considered less important by these elderly, which unfortunately includes oral (self) care (Figs. 1-3).^{5,6} The lack of attention for oral care can lead to poor oral health and can be considered a hidden health hazard as dental awareness and oral health has been shown to significantly contribute to general health and quality of life.^{7,8} Poor oral health subsequently leads to loss of oral function which, amongst others, is related to mobile, fractured or lost teeth (Fig. 4) and malfunctioning of prostheses (Fig. 5), phenomena that are commonly present in care dependent elderly. These unhealthy teeth and/or malfunctioning prostheses can, e.g., cause pain, functional and esthetic problems, and malnutrition, and thus have a strong impact on oral health-related quality of life⁸ and daily activities.⁹ In addition, it has been shown that dental infections and periodontal disease are significantly associated with occurrence and disease activity of diabetes¹⁰, cardiovascular disease¹¹, atherosclerosis^{12,13}, rheumatoid arthritis¹⁴, kidney function¹⁵, pneumonia¹⁶, multiple sclerosis and other systemic immune problems.⁷ Furthermore, cognitive impairment and accumulation of amyloid plaques were shown to be more prevalent in persons with chewing difficulties¹⁷ and poor oral health.¹⁸ This impact of oral health on general health is presumably even higher in institutionalized elderly than elderly in general. Institutionalized elderly are known to have higher levels of *Candida* species (Fig. 6) and *Staphylococci* in their oral environment, being unfavorable circumstances that are associated with a higher risk of developing opportunistic infections.¹⁹



Fig. 1. When general health deteriorates oral health often gets less attention as reflected by the poor oral health maintenance in this patient.



Fig. 2. Underlying diseases and/or multiple drug use are common causes for the severe oral dryness often observed in care dependent elderly.



Fig. 3. Many elderly patients are on multiple drugs which may have a negative impact on salivary secretion and thus on oral clearance.



Fig. 4. Severe tooth decay is rather common in care dependent elderly.



Fig. 5. Care dependent elderly have often not visited their dentist for a rather long period of time. Therefore, malfunctioning, broken and/or dirty dentures are a common place in care dependent elderly.



Fig. 6. Yeast infections are rather frequently seen in patients residing in a nursing home.

Fig. 7. Oral self-care is often reduced and caregivers often do not sufficiently recognize the failing oral self-care in care dependent elderly.



A. The failing oral (self) care has resulted in a bar attachment system being covered with dental plaque and calculus. As a result, the peri-implant mucosa was inflamed and severe peri-implant bone loss had occurred.



B. The basal side of the lower denture of the same patient as in A was covered with food debris, dental plaque and calculus.

Identification of elderly at risk for developing adverse health outcomes based solely on chronic illnesses and age is not the best approach because such an approach disregards the considerable inter-individual variation during ageing.²⁰ Therefore, the concept of frailty was introduced in geriatric care.²⁰⁻²⁴ Frailty reflects a state of vulnerability with regard to poor health outcomes, such as mortality, hospitalization, institutionalization, chronic conditions and loss of function in one or more domains (physical, psychological, cognitive, social).²⁰⁻²⁴ For example, studies have shown that certain individual characteristics, such as socioeconomic class, morbidity (physical and psychological), obesity and formal home care utilization, are associated with higher levels of frailty.^{22,24} However, up to now studies did not include oral status (having own remaining teeth, implants or being edentulous) and oral health (for instance; presence of periodontal diseases, caries and broken teeth).

It has been postulated that elderly with remaining teeth and fixed prosthesis generally have a better oral function than edentulous elderly, resulting in a better quality of life.²⁵ To improve oral functioning of edentulous subjects, implant-supported overdentures are commonly applied. When these implant-supported overdentures function properly, it is presumed that elderly with implant-supported prosthodontics have a better oral functioning than edentulous elderly wearing conventional dentures, both from an oral and general health perspective.²⁶⁻²⁸ Although presumed, this has never been proven for general health. Contrary, when implant-based prosthodontics fail, due to peri-implantitis, implant-based prosthodontics may introduce severe (oral) health problems

itself (Fig. 7). It has not yet been set whether implant-based prosthodontics are indeed a great solution for frail elderly or that it introduces a new oral health hazard when a poor peri-implant health is developing or present in frail elderly or elderly with complex care needs. Consequently, the impact of oral status and oral health on general health, frailty and/or cognitive dysfunction in frail elderly or elderly with complex care needs remains unclear.

Aim of the study

The general aim of the study was to assess oral status and oral health of frail community living (elderly who live in their own home) and indwelling elderly (elderly in nursing homes) as well as their impact on general health, frailty and quality of life. Specific aims were:

- to assess oral status and oral health of long-stay elderly newly admitted to a nursing home as well as their need for oral care during their stay in the nursing home (Chapter 2);
- to assess oral status and oral health of care dependent community living elderly who recently (<6 months) received formal home care as well as to assess the impact of their oral health on frailty, general health and quality of life (Chapter 3);
- to assess oral status and (self-reported) oral health problems in community living robust, frail and complex care elderly as well as to analyze relations between their oral status and frailty, general health, activity of daily living (ADL) and quality of life (QoL) (Chapter 4);
- to assess whether age has influence on peri-implant health in patients treated with mandibular implant-retained overdentures (Chapter 5);
- to assess possible complications that can occur in care dependent frail elderly patients with transmandibular implants (Chapter 6).

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